LIMITED CIRCULATION

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Meteorological information available in Wales

by C P Roe

Introduction

Weather is a vital factor in many agricultural studies and it is the earnest wish of the Regional Agricultural Meteorology Department that meteorological information and its availability should be carefully studied and assessed before investigations and study programmes are begun. Such foresight can pay dividends, for example, in choosing experimental sites near to representative meteorological stations.

This publication has been compiled to aid ADAS colleagues in planning their investigations and advisory work where weather has a role to play. It should also be of interest to agriculturalists and horticulturalists who realise the importance of meteorological data and advice as an aid in management.

Information available

Climatological data are available for over 70 stations and these are listed in Table 1*together with the elements recorded and over what period (Stations near the Welsh border have been included for completeness). Of the stations listed, 53 are still making observations at the present time and these can be distinguished by no closing date in the 'period' column of Table 1.

The range of information reported will depend upon the type of station:-

A - Agricultural meteorological stations record soil temperatures at a selection of depths and 'run-of-wind' in addition to the standard climatological observations.

C - Climatological stations cooperate voluntarily with the Meteorological Office.

H - Health resort stations, which are climatological stations participating in a scheme whereby information is sent daily to the Meteorological Office for communication to the Press.

A, C and H type stations make daily observations at 0900 GMT with some making an observation at 2100 GMT also. The health resort stations make an additional observation at 1800 GMT for inclusion in the Press reports.

M - Meteorological Offices staffed by professional meteorologists. These are generally located at RAF or CAA airfields, and, in addition to daily observations, maintain high quality hourly records (usually 3, 4, 6, 8 or 24 observations per day) which afford the basis for weather forecasts.

In addition to those stations shown in Table 1, four so-called 'auxiliary synoptic' stations have opened (see Table 4). They are not yet included on our climatological datasets because they have only recently started taking complete observations. Their data is available on request.

* While every effort has been made to ensure that the dates given in Table 1 are accurate, there were, however, occasions when the periods were unknown so a guess had to be made.

For ease of reference, location maps of stations reporting air temperatures and grass minima, soil temperatures at various depths, sunshine and run-of-wind are given in figures 1 to 4 respectively.

It may be that trials have been carried out over a particularly unrepresentative period of weather in which case it would be better to relate the data observed to the long-term averages of the elements concerned. Analysis of long term records can show, for example, whether a particularly cold or wet spell represents say a 1 in 20 year occurrence or, alternatively, is not unusual at all. Those stations with long term averages of air temperature, 30 cm soil temperature, sunshine and windspeed and shown in figures 1 to 4 respectively.

Often of interest for planning purposes are the return periods of specific elements i.e. the frequency with which a specified occurrence has occurred over a given time scale and hence might be expected to occur in the future. Table 2 shows those stations for which return periods of mean wind speeds and gusts have been calculated and Table 3 shows those stations with a return period for rainfall. These are just two examples of derived meteorological data and serve to illustrate the vast range of statistical analyses which can be performed on basic meteorological data.

Rainfall

All the meteorological stations listed in Table 1 record daily rainfall. In addition there is a dense network of rain gauges maintained to strict standards by water authorities, river boards, local authorities, colleges, schools and enthusiastic amateurs; these are shown in figures 5a (N. Wales) and 5b (S. Wales). Some of these gauges will have a 1941-70 average annual rainfall and so will a large number not shown because they have closed. Averages for all these sites are available on request.

Although a particular trial plot is unlikely to be more than a few kilometres away from a rain gauge, rainfall in Wales varies markedly from place to place - even over short distances - so the question of representativity of a particular gauge must be borne in mind. It is therefore recommended that for investigations where rainfall is of critical importance, a rain gauge should be installed on-site in the absence of a suitable alternative. (Incidentally, the Regional Agricultural Meteorology Department has a limited stock of equipment including rain gauges, thermometers, hygrographs, thermographs, anemometers etc which can be used for advisory work in collaborative projects).

Requesting data

It will often be fruitful to discuss your requirements for met. data with us at an early stage in a planned experiment for the reasons already discussed. We can advise on a suitable site and the format of the data which will be of most use to you - often this will be a statistical treatment of the raw data. Having determined your requirements the data can be supplied either as a computer print-out or on microfiche.

Any comments or suggestions on this paper should be sent to the author.

Regional Agricultural Meteorology Department
WOAD
Trawsgoed
Aberystwyth
Dyfed
SY23 4HT

Tel. Crosswood 301 Ext 224/259

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TABLE 1

SUMMARY OF ELEMENTS REPORTED BY EACH STATION

Table showing the first complete year of record available for each element. When more than one year is given in the period column the second year refers to the date when records of all the elements ceased.

	STATION	TYPE	NATIONAL GRID REF EAST	NORTH	ALTITUDE (METRES)	PERIOD	GRASS MINIMUM	DRY/WET BULB	SOIL TEMPERATURES 10 cm	20 cm	30 cm	50 cm	100 cm	RAIN	SUN	RUN OF WIND	ANEMO-GRAPH
1	ABER	A	2650	3728	18	1959–82	61	59	–	–	–	78	71–77	59	59	–	–
2	ABERPORTH	M	2242	2521	133	1957	57	57	–	–	83	–	–	57	57	57	1970
3	ABERYSTWYTH	H	2584	2814	4	1959–79	–	59	–	–	–	–	–	–	59	–	1965–69
4	ABERYSTWYTH PBS	C	2605	2825	137	1952–68	52	52	–	–	–	–	–	52	52	–	–
5	ALWEN	C	2957	3529	335	1959	59	59	–	–	–	–	–	59	–	–	–
6	BALA	C	2935	3356	163	1970	70	70	71	71	70	71	70	70	70	70	–
7	BARDSEY ISLAND	C	2111	3206	15	1980	80	80	–	–	–	–	–	80	–	–	–
8	BETWS-Y-COED	C	2803	3571	20	1977	77	77	77	–	77	–	–	77	–	–	–
9	BOTWNNOG	C	2263	3313	34	1961	61	61	–	–	61	61	61	61	61	–	–
10	BRANDY	M	1851	2248	111	1975	75	75	–	–	–	–	–	75	75	75	1975
11	BRIDGEND	C	2919	1796	40	1975	75	75	–	–	75	–	75	75	–	75	–
12	BRYNAMAN	M	2718	2143	183	1970	70	70	–	–	–	–	–	70	–	–	–
13	BURROWS	C	2438	1941	5	1969–80	77	69	–	–	–	–	–	69	–	–	–
14	BWLCHGWYN	C	3236	3520	386	1959	59–78	59	–	–	59	–	–	59	–	–	–
15	CARDIFF	C	3195	1793	62	1913–76	59	59	–	–	59	–	59	59	59	59	1959
16	CARDIFF (BUTE PARK)	C	3176	1773	9	1978	78	78	79	79	79	79	78	78	78	–	–
17	CARMARTHEN	A	2412	2183	15	1962	62	62	62–76	62–76	63	63	62	62	62	62–72	–
18	CEINWS	C	2759	3061	61	1962–75	62	62	–	–	–	–	–	62	–	–	–
19	CENARTH	C	2957	2772	308	1977–80	77	77	–	–	–	–	–	77	–	–	–
20	CILFYNYDD	M	3099	1939	194	1975	75	75	–	–	–	–	–	75	–	75	1974
21	COLWYN BAY	H	2860	3787	24	1971	–	71	–	–	71	–	–	71	71	–	–
22	CORS FOCHNO	C	2634	2918	5	1980	80	80	–	–	–	–	–	80	80	–	–
23	CORWEN	A	3048	3398	144	1959	59	59	59	59	–	59	–	59	–	–	–
24	CRUMBLAND	A	3474	2024	245	1959	59	59	59	59	59	59	59	59	59	59	–
25	CWM DYLI	C	2653	3541	99	1959–67	59	59	–	–	59	–	–	59	–	–	–
26	CWMSTRADLLYN	C	2557	3442	204	1975	–	75	–	–	–	–	–	75	75	75	–
27	CWMYSTWYTH	A	2773	2749	301	1959	59	59	59	59	79	59	–	59	59	59	–
28	DALE FORT	C	1823	2052	33	1959	59	59	–	–	61	–	–	59	59	78	–
29	DOGERDDAN	A	2627	2835	31	1959	59	59	59	59	82	59	–	59	59	59	–
30	HAVERFORDWEST	C	1955	2153	41	1951–64	–	51	–	–	–	–	–	51	51	–	–
31	HAVERFORDWEST	C	1956	2146	8	1968–73	–	68	–	–	–	–	–	68	68	–	–
32	HAWARDEN BRIDGE	C	3314	3694	5	1959	–	59	–	–	–	–	–	59	–	–	–
33	LAKE VYRNWY	C	3017	3188	303	1959	59	59	77	–	61	–	–	59	–	–	–
34	LLANFAIR CAEREINION	C	3133	3057	236	1978	78	78	–	–	78	–	–	78	–	–	–
35	LLANDRINDOD WELLS	C	3061	2605	235	1959–73	–	59	–	–	62–73	–	–	59	59	–	–
36	LLANDUDNO	H	2777	3818	4	1959–67	–	59	–	–	–	–	–	59	59	–	–
37	LLANGENNY	C	3241	2184	122	1974	–	74	–	–	–	–	–	74	–	–	–
38	LLETY-EVAN-HEN	C	2693	2851	290	1959–76	59	59	59	–	–	–	59	59	59	64	–
39	LLWYNON	C	3011	2113	241	1959–78	–	59	–	–	–	–	–	59	59	–	–
40	LLYN ALAW	C	2376	3853	44	1975	–	75	–	–	–	–	–	75	75	75	–
41	LLYN STWLAN	C	2665	3442	504	1959–63	59	59	–	–	–	–	–	59	–	–	–
42	LOGGERHEADS	C	3201	3622	210	1961	61	61	64–64	64–66	61	62	61	61	68	61	–
43	LYONSHALL	C	3339	2576	155	1959	59	59	–	–	–	–	–	59	–	–	–
44	MILFORD HAVEN	M	1892	2054	37	1965	65	65	–	–	–	–	–	65	–	65	1965
45	MOEL CYNNEDD	C	2843	2877	358	1969	69	69	–	–	76	–	–	69	–	69	–
46	MUMBLES HEAD	M	2627	1870	35	1958	58	58	–	–	–	–	–	58	–	–	–
47	NEATH	C	2715	1958	62	1959	59	59	–	–	–	–	–	59	–	–	–
48	NESS GARDENS	C	3303	3754	30	1966	66	66	73	73	73	–	–	66	69	66	–
49	NEWPORT (GWENT)	A	3279	1849	23	1959–78	61	59	59	59	–	59	–	59	59	59	–
50	ORIELTON	C	1953	1992	61	1965	65	65	65	65	65	–	–	65	–	–	–
51	OSWESTRY	C	3279	3295	174	1959	59	59	–	–	–	–	–	59	59	–	–
52	PENMAEN	A	2531	1889	87	1968	68	68	70	70	70	70	70	68	71	–	–
53	PEN-Y-FFRIDD	A	2563	3705	84	1959	59	59	59	59	–	59	–	59	59	59	–
54	PORTHCAWL	C	2822	1771	6	1959	–	59	–	–	–	–	–	59	59	–	–
55	PORT TALBOT	C	2785	1868	5	1959–82	59	59	–	–	–	–	–	59	59	59	1959–79
56	PRESTON MONTFORD	C	3432	3144	67	1977	77	77	–	–	77	–	77	77	77	79	–
57	PRESTON WYNNE	A	3564	2475	84	1959	59	59	59	59	–	59	–	59	59	60	1977
58	PRESTATYN	H	3061	3836	4	1959	–	59	–	–	–	–	–	59	59	–	–

TABLE 1 (contd)

	STATION	TYPE	NATIONAL GRID REF EAST	NATIONAL GRID REF NORTH	ALTITUDE (METRES)	PERIOD	GRASS MINIMUM	DRY/WET BULB	SOIL TEMPERATURES 10 cm	20 cm	30 cm	50 cm	100 cm	RAIN	SUN	RUN OF WIND	ANEMO-GRAPH
59	RHOOSE	M	3064	1679	67	1957	57	57	-	-	-	-	-	57	57	-	1957
60	RHYL	H	3001	3807	9	1959	59-72	59	-	-	-	-	-	59	59	-	-
61	ROSS-ON-WYE	A	3598	2237	68	1952-74	52	52	-	-	52	-	52	52	52	-	1970-74
62	RUTHIN	C	3133	3584	76	1960	-	59	-	-	-	-	-	59	64	-	-
63	SHAWBURY	M	3553	3220	72	1957	57	57	-	-	-	-	-	57	57	57	1972
64	SKOKHOLM	C	1738	2052	34	1965	65	65	-	-	-	-	-	65	65	65	-
65	SWANSEA	C	2642	1923	10	1959	59	59	-	-	59	-	59	59	59-70	-	-
66	SWYDDFFYNON	C	2696	2655	179	1959-73	59	59	-	-	-	-	-	59	61	-	-
67	TENBY	H	2129	2001	5	1974	-	74	-	-	-	-	-	74	74	-	-
68	TRAWSFYNYDD	C	2695	3390	193	1961	61	61	-	-	-	-	-	61	-	-	1961
69	TRAWSGOED	A	2674	2736	61	1959	59	59	59	59	62	59	-	59	59	59-81	-
70	TREGARON	C	2669	2625	178	1975-80	75	75	-	-	-	-	-	75	75	-	-
71	USK	C	3370	2018	21	1959	59	59	59	59	59	59	-	59	59	-	-
72	VALLEY	M	2309	3757	10	1931	49	49	-	-	-	-	-	31	49	57	1957
73	WHITCHURCH	C	2162	2356	129	1976	77	76	78	78	78	-	78	76	-	-	-
74	WREXHAM	C	3338	3509	88	1959-76	59	59	-	-	59	-	59	59	-	-	-

TABLE 2

Stations for which return periods of mean wind speeds and maximum gust speeds are available* i.e. speeds likely to be exceeded only once in a stated number of years.

10 or more years data	less than 10 years data
Aberporth	Trawsfynydd
Holyhead	Milford Haven II
Milford Haven I	
Port Talbot	
Rhoose	
Valley	

*taken from MO publication Climatological Memo. No. 50A - "Extreme winds over the UK for periods ending 1971".

TABLE 3

Stations for which frequencies of specified rainfall amounts within specified durations are available*.

Aberporth	1946-70	Upper Lliw	1959-68
Hawarden	1922-56	Valley	1924-70
Pembroke Dock	1948-57	Wrexham	1944-56
Rhoose	1954-70		
Ross-on-Wye	1939-60		
Shrewsbury	1948-70		

*taken from MO publication Hydrological Memo. No 41 - "Frequencies of specified rainfall amounts within specified durations over England and Wales".

TABLE 4

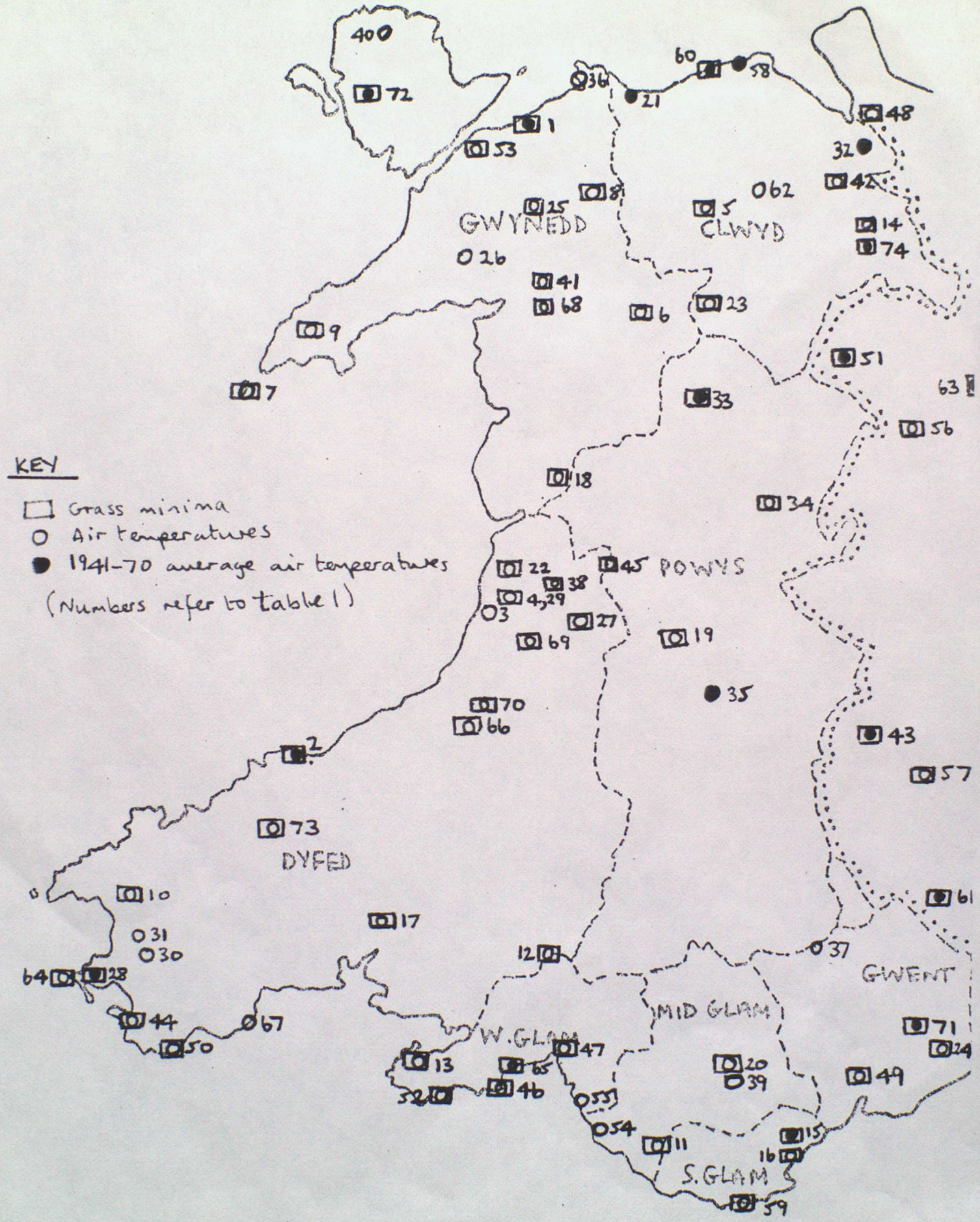
Recently opened stations for which short term meteorological records are available but which have not yet been included on the climatological datasets.

	Height (m)	Opened	NGR	Observations*
Aberdovey	22	August 1978	2598 2967	09,12,15 GMT
Cynwyd	208	June 1982	3055 3403	09,12,18 GMT
Nantmor	53	January 1982	2604 3462	3 hourly 09-21 GMT
St Harmon	279	November 1982	2990 2726	3 hourly 09-18 GMT

* In addition to the standard climatological observations at 09 (and possibly 21 GMT) they also report hourly observations at the times shown.

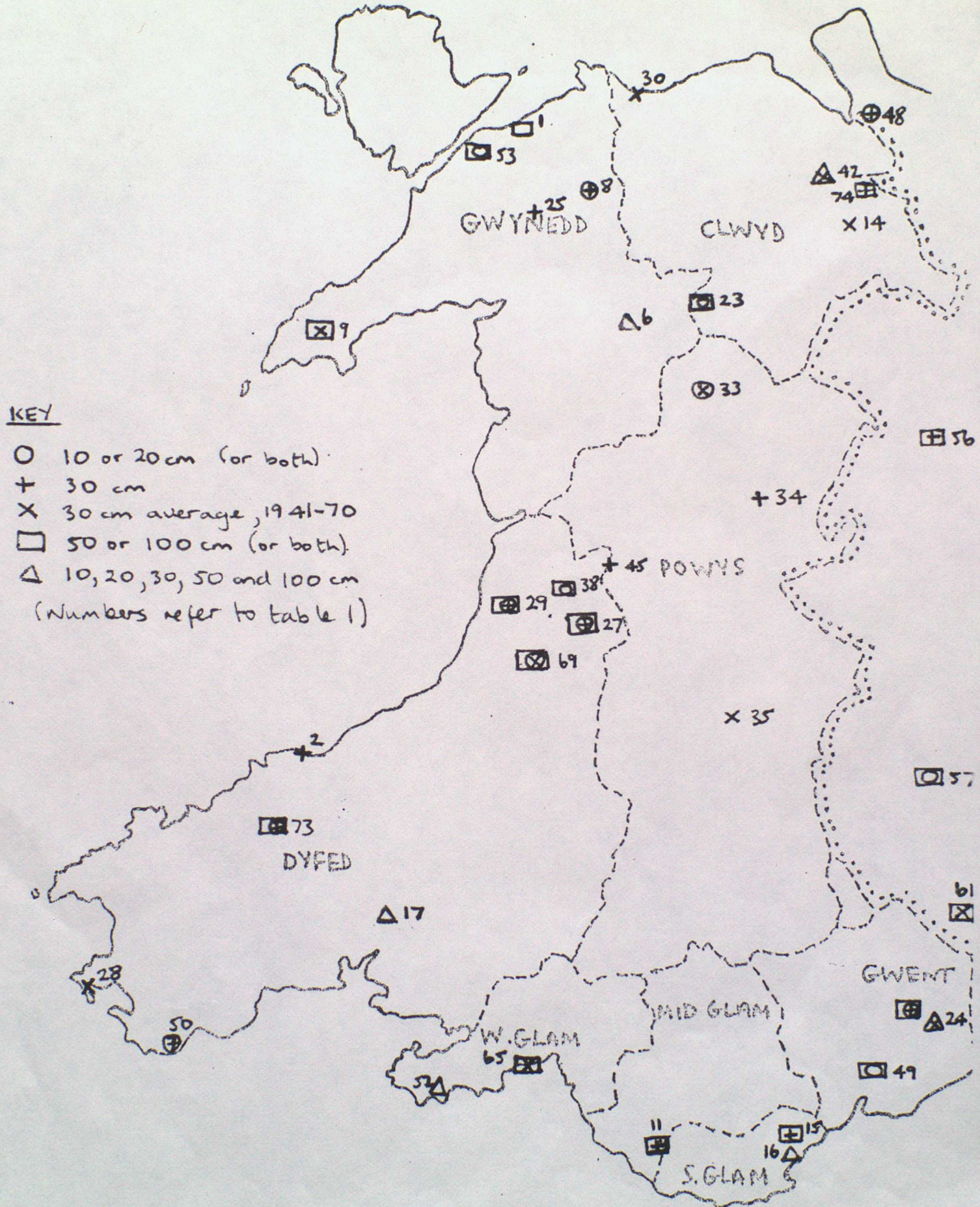
STATIONS RECORDING SCREEN AIR TEMPERATURES AND GRASS MINIMA

FIG. 1



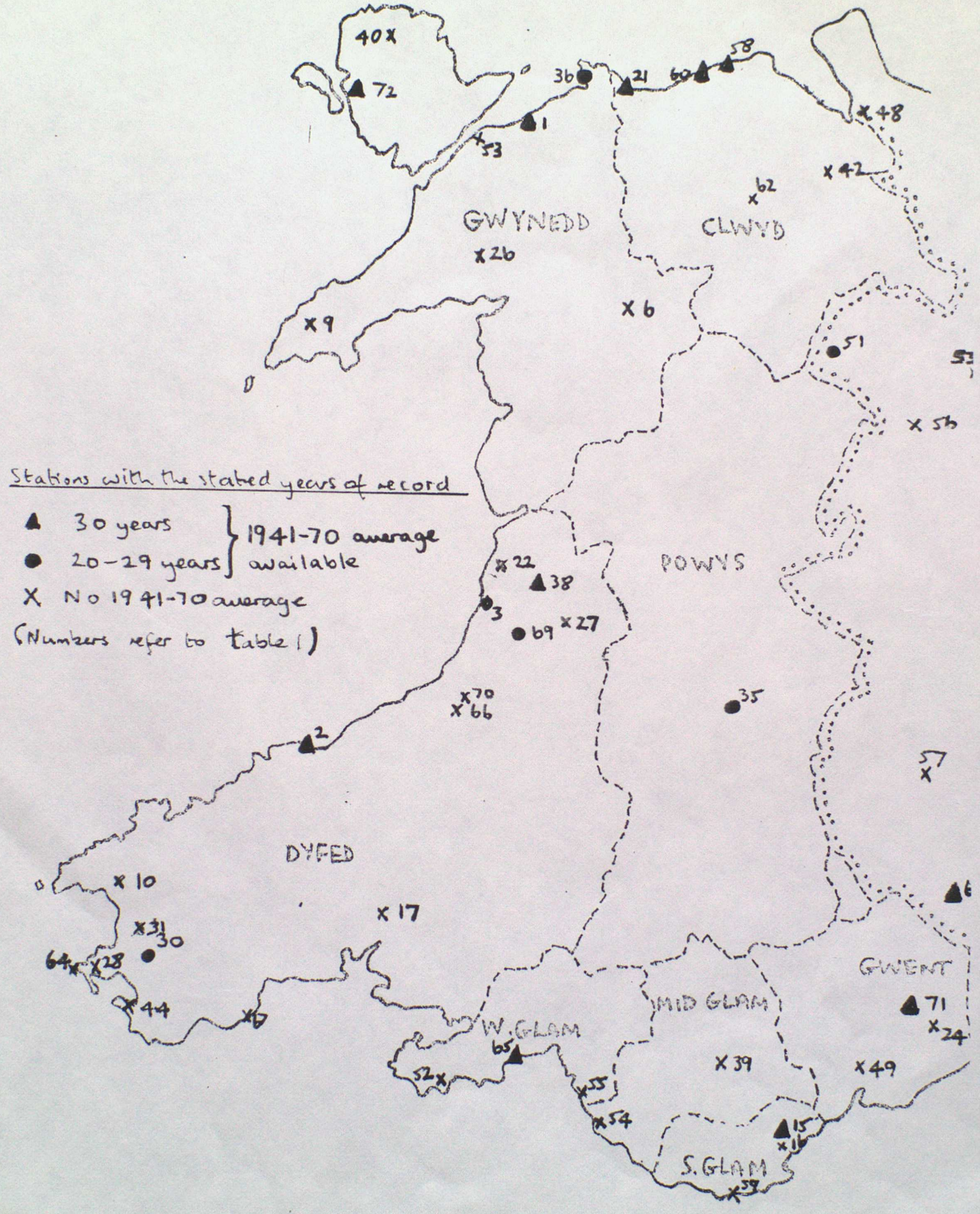
STATIONS RECORDING SOIL TEMPERATURES AT VARIOUS DEPTHS

FIG. 2



STATIONS REPORTING SUNSHINE

FIG. 3.



STATIONS RECORDING WINDS

FIG. 4

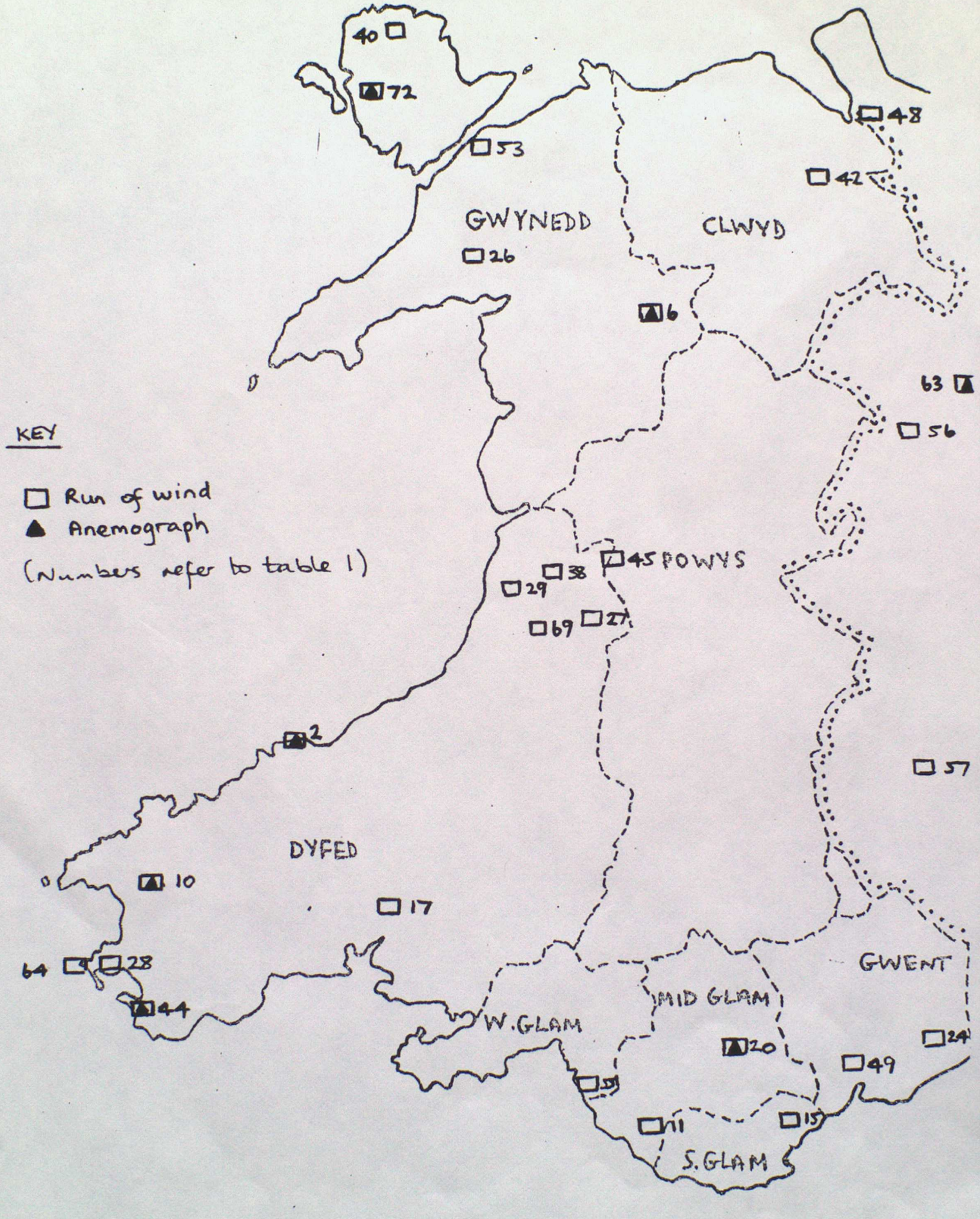


FIG. 5A.

RAINGAUGES — N. WALES

FIG 5B . RAINGAUGES - S. WALES